

REMARKS

In response to the Office Action dated November 2, 2007, Applicant respectfully requests reconsideration based on the above listed claims and the following remarks. Applicant respectfully submits that the claims as presented are in condition for allowance.

In the Claims:

- Claims 1-68 are pending in the application.
- Claims 2-3, 9-25, 32-40, 42, 46-50, 52-54, 56, 60-66, and 68-70 were previously withdrawn.
- Claims 1, 4, 8, 30, 41, and 55 are currently amended.
- Claims 1-68 are pending in the application.
- Claims 1, 4-8, 26-31, 41, 43-45, 51, 55, 57-59 and 67 are pending examination.

Claim Objections

Claim 8 was objected to as having unclearly defined variables. Claim 28 has been amended to fix this error.

1 **Rejections Under 35 U.S.C. § 112 first paragraph**

2 Claims 8 and 30 were rejected as failing to comply with the enablement
3 requirement.

4 Claim 8 has been amended to rectify $f_1(x)$ and $f_2(x)$ into f_1 and f_2 .

5 Claim 30 has been amended to rectify the rejected language “mirror
6 invariant features are threshold configured.” Support for the amendment is found
7 at page 34, lines 14-19.

8 Applicant respectfully requests that the 35 U.S.C. § 112 first paragraph
9 rejection be removed from claims 8 and 30.

10 **Rejections Under 35 U.S.C. § 112 second paragraph**

11 Claims 4, 5 and 8 are rejected as being indefinite for failing to particularly
12 point and distinctly claim the subject matter that the applicant regards as the
13 invention.

14 Claim 4 has been amended to change its dependency to claim 2, thereby
15 providing proper antecedent basis for “said plurality of portions.”

16 Claim 5 depends from claim 4, so overcoming the § 112 second paragraph
17 rejection of claim 4 also overcomes the corresponding rejection of claim 5.

18 Claim 8 has been amended to rectify $f_1(x)$ and $f_2(x)$ into f_1 and f_2 .

19 Applicant respectfully requests that the 35 USC § 112 second paragraph
20 rejections of claims 4, 5, and 8 be removed.
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1 **Claim Rejections under 35 USC § 102**

2 Claims 1, 4-8, 26-31, 41, 43-45, 51, 55, 57-59, and 67 were rejected under
3 35 USC § 102(b) as being anticipated by “Robust Real-time object detection” by
4 Viola et al (“the Viola reference” or “Viola”).

5
6 **Claim 1**

7 Claim 1, as currently amended, defines a method for use in detecting faces
8 within a digital image, the method comprising:

- 9
- 10 • processing a set of initial candidate portions of digital image data in a
11 boosting filter stage that uses a boosting chain to produce a set of
12 intermediate candidate portions; and
 - 13
14 • processing said set of intermediate candidate portions in a post-filter
15 stage to produce a set of final candidate portions, wherein the post-filter
16 stage includes an image pre-processing process, a color-filter process,
17 and a support vector machine (SVM) filter process.
- 18

19 The Viola reference, on the other hand, describes a visual object detection
20 frame work capable of rapidly processing images and achieving high detection
21 rates. There are numerous elements of Applicant’s subject matter that Viola does
22 not show or disclose. Particularly, Viola does not show or disclose each element
23 of Applicant’s claim 1. For example, Viola does not show or disclose processing a
24 set of initial candidate portions of digital image data in a boosting filter stage that
25 uses a boosting chain to produce a set of intermediate candidate portions.

1 Viola describes a method for constructing a classifier by selecting some
2 important features using modified AdaBoost. However, Viola fails to disclose a
3 set of initial candidate portions of digital image data in a boosting filter stage that
4 uses a boosting chain to produce a set of intermediate candidate portions. Viola
5 simply states that each stage of a boosting process, which selects a new weak
6 classifier, can be used in a feature selection process. The subject matter of Claim
7 1, on the other hand, describes a boosting chain that is adopted to combine
8 boosting classifiers within a hierarchy “chain” structure. By utilizing inter-layer
9 discriminative information, a hierarchy chain structure *improves efficiency when*
10 *compared to traditional cascade approaches*. (Application, page 14 lines 12-14).
11 Viola fails to disclose such a boosting chain. Thus, Viola does not disclose a
12 boosting filter stage nor does it disclose a boosting chain to produce a set of
13 intermediate candidate portions.

14 Further, Viola also does not disclose processing the set of intermediate
15 candidate portions in a post-filter stage to produce a set of final candidate portions
16 wherein the post-filter stage includes an image pre-processing process, a color-
17 filter process, and a SVM filter process. Viola describes a method for combining
18 more complex classifiers in cascade to increase the speed of the detector by
19 focusing attention on promising regions. Viola fails, however, to disclose a post-
20 filter stage to produce a set of candidate portions.

21 The subject matter of claim 1 describes a post-filtering stage wherein image
22 pre-processing, color-filtering, and SVM-filtering are applied to refine the final
23 face detection prediction (application, page 5, lines 10-13). Thus, Viola fails to
24 disclose processing said set of intermediate candidate portions in a post-filter stage
25

1 to produce a set of final candidate portions, wherein the post-filter stage includes
2 image pre-processing, color-filtering, and SVM filtering.

3 Since Viola does not show or disclose each element of claim 1, Applicant
4 respectfully requests that the 35 USC 102(b) rejection be removed, and further
5 submits that claim 1 is allowable over the Viola reference.

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7 **Claims 4-8, 26-31**

8 For at least the reasons set forth above with respect to claim 1, Applicant
9 submits that dependent claims 4-8, and 26-31 are also allowable over the Viola
10 reference. Dependent claims contain the language of the claims from which they
11 depend. Claims 4-8, and 26-31 depend from claim 1, therefore Applicant submits
12 that claims 4-8, and 26-31 are allowable.

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14 **Claim 41**

15 Claim 41 defines a computer-readable medium having computer-
16 implementable instructions for causing at least one processing unit to perform acts
17 including:

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- 19 • detecting possible human face image data within a digital image using a
20 multiple stage face detection scheme that includes:
21
 - 22 • at least a boost filtering stage configured to process a set of initial candidate
23 portions of digital image data using a boosting chain to produce a set of
24 intermediate candidate portions; and
25

- a post-filtering stage configured to process said set of intermediate candidate portions to produce a set of final candidate portions, wherein the post-filter stage includes an image pre-processing process, a color-filtering process, and a support vector machine (SVM) filtering process.

For reasons similar to those discussed above for claim 1, the Viola reference does not show or disclose each element of claim 41. For example, Viola does not show or disclose “a boosting filter stage configured to process a set of initial candidate portions of digital image data using a boosting chain to produce a set of intermediate candidate portions, and a post-filter stage configured to process said set of intermediate candidate portions to produce a set of final candidate portions, wherein the post-filter stage includes an image pre-processing process, a color-filtering process, and a support vector machine (SVM) filtering process.”

Since Viola does not show or disclose each element of claim 41, Applicant respectfully submits that claim 41 is allowable over Viola and requests that the USC 102(b) rejection be removed.

Claims 43-45 and 51

For at least the reasons set forth above with respect to claim 41, Applicant submits that dependent claims 43-45 and 51 are also allowable over the Viola reference. Dependent claims contain the language of the claims from which they depend. Claims 43-45 and 51 depend from claim 41, therefore Applicant submits that these claims are allowable.

1 **Claim 55**

2 Claim 55 defines an apparatus, including:

- 3
- 4 • logic operatively configured to detect at least one human face within a
- 5 digital image using a multiple stage face detection process that includes:
- 6
- 7 • at least a boosting filter stage configured to process a set of initial candidate
- 8 portions of digital image data using a boosting chain to produce a set of
- 9 intermediate candidate portions;
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- 11 • a post-filter stage configured to process said set of intermediate candidate
- 12 portions to produce a set of final candidate portions, wherein at least one of
- 13 said final candidate portions includes detected face image data; and
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- 15 • wherein the post-filter stage includes an image pre-processing process, a
- 16 color-filtering process, and a support vector machine (SVM) filtering
- 17 process.
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19 For reasons similar to those discussed above for claim 1, the Viola

20 reference does not show or disclose each element of claim 55. For example, Viola

21 does not show or disclose “a boosting filter stage configured to process a set of

22 initial candidate portions of digital image data using a boosting chain to produce a

23 set of intermediate candidate portions, and a post-filter stage configured to process

24 said set of intermediate candidate portions to produce a set of final candidate

25 portions, wherein at least one of said final candidate portions includes detected

1 face image data,” and “wherein the post-filter stage includes an image pre-
2 processing process, a color-filtering process, and a support vector machine (SVM)
3 filtering process.”

4 Since Viola does not show or disclose each element of claim 55, Applicant
5 respectfully submits that claim 55 is allowable over Viola and requests that the 35
6 USC 102(b) rejection be removed.

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9 **Claims 57-59 and 67**

10 For at least the reasons set forth above with respect to claim 55, Applicant
11 submits that dependent claims 57-59 and 67 are also allowable over the Viola
12 reference. Dependent claims contain the language of the claims from which they
13 depend. Claims 57-59 and 67 depend from claim 55, therefore Applicant submits
14 that these claims are allowable.

15
16 **Conclusion**

17 Applicant submits that the pending claims are in condition for allowance
18 and respectfully requests issuance of the subject application.

19
20 Respectfully Submitted,

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22 Date: March 3, 2008

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